MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Mail Stop 2321
Gaithersburg, Maryland 20899

SRM Number: 2620a
MSDS Number: 2620a
SRM Name: Carbon Dioxide in Nitrogen
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MSDS Coordinator: Mario Cellarosi
Phone: (301) 975-6776
ChemTrec: 1-800-424-9300

FAX: (301) 926-4751
E-mail: SRMMSDS@nist.gov

SECTION I. MATERIAL IDENTIFICATION

Material Name: Carbon Dioxide in Nitrogen

Description: This SRM mixture is supplied in a DOT 3AL specification aluminum (6061 alloy) cylinder with a water volume of 6 L. Mixtures are shipped with a nominal pressure exceeding 12.4 MPa (1800 psi), which provides the user with 0.73 m^3 (25.8 ft^3) of useable mixture. The cylinder is the property of the purchaser and is equipped with a CGA-580 brass valve, which is the recommended outlet for this carbon dioxide mixture. NIST recommends that this cylinder not be used below 0.7 MPa (100 psi).

Other Designations: Carbon Dioxide in **Nitrogen** Gas Cylinder

Name	Chemical Formula	CAS Registry Number
Carbon Dioxide	CO_2	124-38-9
Nitrogen	N_2	7727-37-9

DOT Classification: Nonflammable Gas UN1956

Manufacturer/ Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration %	Limits and Toxicity Data
Carbon Dioxide	1.0 mol/mol	ACGIH TLV-TWA: 5000 mg/kg
		OSHA PEL-TWA: 5000 mg/kg
Nitrogen	Balance	Simple asphyxiant

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Carbon Dioxide in Nitrogen
Appearance: Colorless
Odor: Odorless
Physical State: Gas
Vapor Pressure: Not Applicable
Vapor Density (Air = 1): 0.970 to 1.080
Boiling Point: Not Applicable
Solubility in Water: 1.485 cm^3/100 cm^3 H_2O
Specific Gravity (H_2O = 1): Gas
Evaporation Rate: Gas
Odor Threshold: Not Applicable

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: Nonflammable **Method Used:** Not Applicable **Autoignition Temperature:** Not Applicable

Flammability Limits in Air (Volume %): **UPPER:** Not Applicable
LOWER: Not Applicable

Extinguishing Media: Use extinguishing media that is appropriate to the surrounding fire.

Hazardous Combustion Products: None

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full facepiece. Keep fire exposed cylinders cool with water spray. If possible, stop the product flow.

Unusual Fire and Explosion Hazards: Nitrogen is a nonflammable material that will not support combustion. Cylinders may rupture under fire conditions.

SECTION V. REACTIVITY DATA

Stability: **_X_ Stable** **_____Unstable**

Conditions to Avoid: Avoid exposure to sparks, open flames, hot surfaces, and all sources of heat and ignition. Cylinder temperature should not exceed 52 °C. Avoid storage in poorly ventilated areas.

Incompatibility (Materials to Avoid): Carbon dioxide reacts with alkaline materials. Carbon dioxide decomposes when heated above 1700 °C. Nitrogen reacts with lithium, neodymium, and titanium at high temperatures.

Hazardous Polymerization: **_____ Will Occur** **_X_ Will Not Occur**

See Section IV: *Fire and Explosion Hazard Data*

Hazardous Decomposition or Byproducts: Not Applicable

SECTION VI. HEALTH HAZARD DATA

Route of Entry: **_X_ Inhalation** **____ Skin** **____ Ingestion**

Health Hazards (Acute and Chronic): This mixture is a compressed gas that can cause rapid suffocation.

Acute Effects: Exposure to carbon dioxide at 1 % to 4 % concentrations result in increased respiratory volume. Concentrations greater than 4 % produce labored breathing and are dangerous for even a few minutes. Mixture can act as a simple asphyxiant by displacing air necessary for life. Symptoms include rapid respiration, muscular incoordination, fatigue, dizziness, nausea, vomiting, unconsciousness, and death.

Chronic Effects: None known

Medical Conditions Generally Aggravated by Exposure: None known

Other Effects of Exposure: Not Applicable

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: None

Eye Contact: None

Inhalation: Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give carbon dioxide.

Ingestion: None

NOTE: In the event of exposure, obtain medical assistance.

TARGET ORGAN(S) OF ATTACK: Not Applicable

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Shut off source if possible and remove source of heat. In case of leakage, use SCBA.

Waste Disposal: Dispose of nonrefillable cylinders in accordance with federal, state, and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood.

Handling and Storage: Secure cylinders when using to protect from falling. Use hand truck to move cylinders. Wear safety shoes when handling cylinders.

Store in well ventilated areas. Use adequate general and local exhaust ventilation to avoid asphyxiation. Keep valve protection cap on cylinders when not in use. For eye protection, wear safety glasses.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Cylinder temperature should not exceed 52 °C and use only with equipment rated for cylinder pressure. Close valve when not in use and when cylinder is empty. Make sure cylinder is properly secured when in use or stored.

SECTION VIII. SOURCE DATA/ OTHER COMMENTS

Source: Scott Specialty Gases, MSDS *Carbon Dioxide in Nitrogen*, 09 March 2001.

Disclaimer: Physical and chemical data contained in this MSDS are provided for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data on the MSDS. The certified value for this material are given only on the NIST Certificate of Analysis.